

EXHIBIT A

"Visualizing Network Data" by R.A.Becker, S.G.Eick and A.R.Wilks / p228fig1



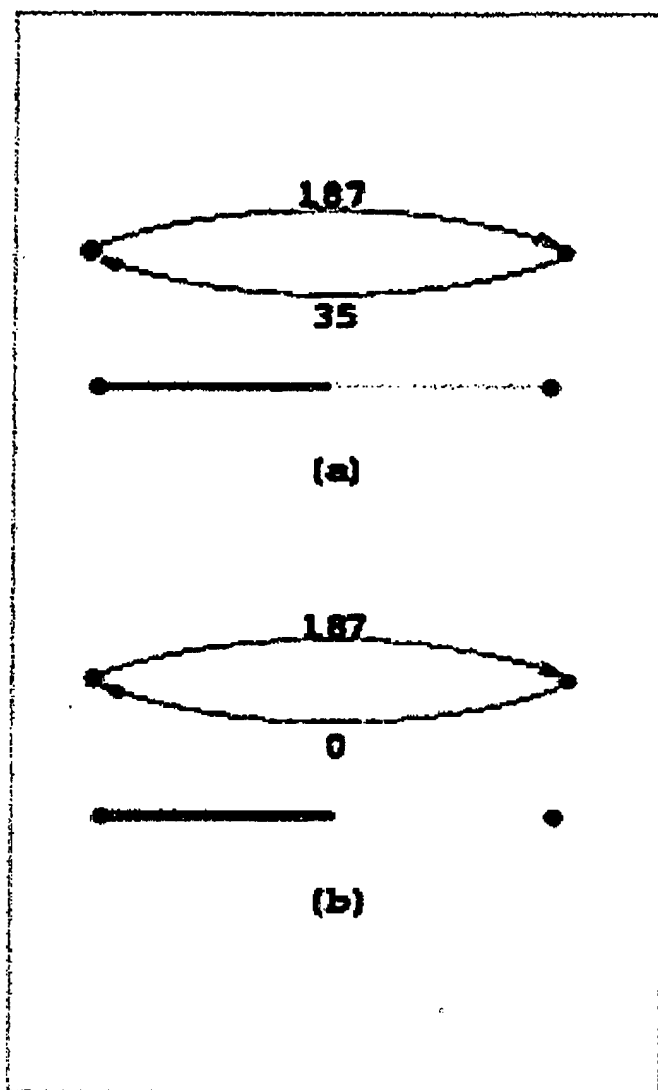
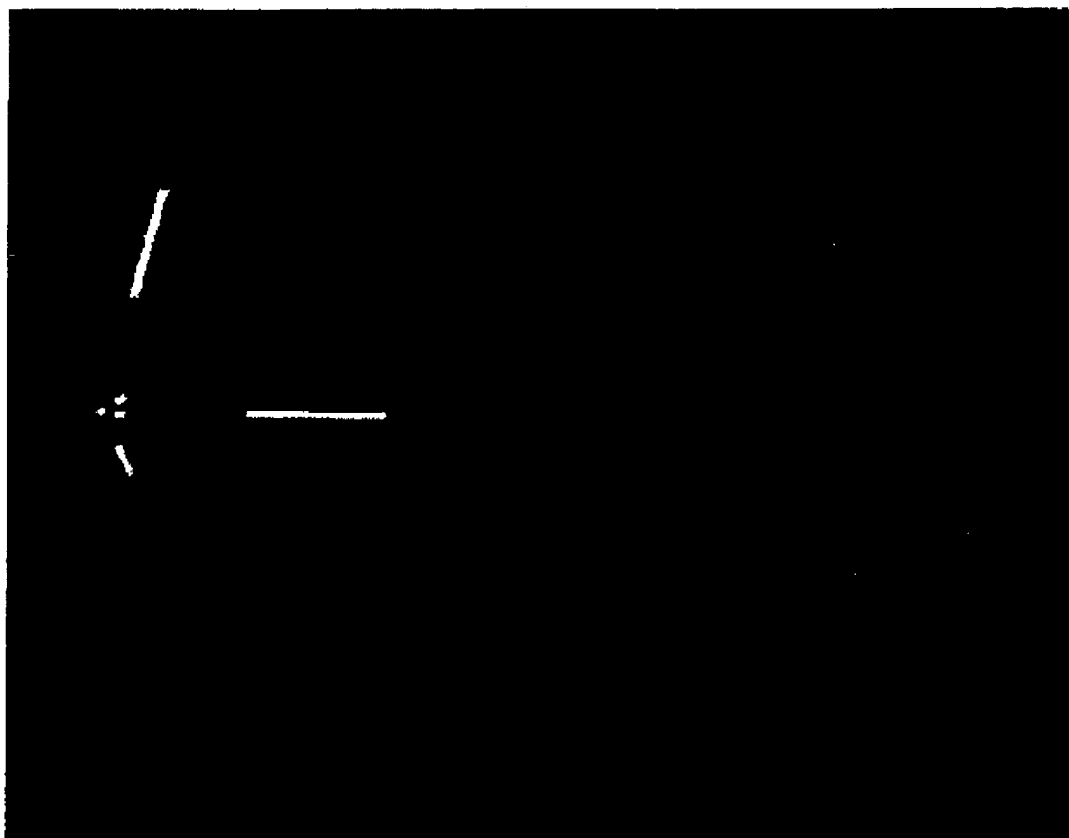


FIGURE 1

Representing Link Data. In part (a), the upper illustration is a conventional arrow diagram with numbers to show link statistics; the lower illustration uses line thickness and color to convey the same information more compactly. Part (b) shows how half-lines represent statistics with value zero.

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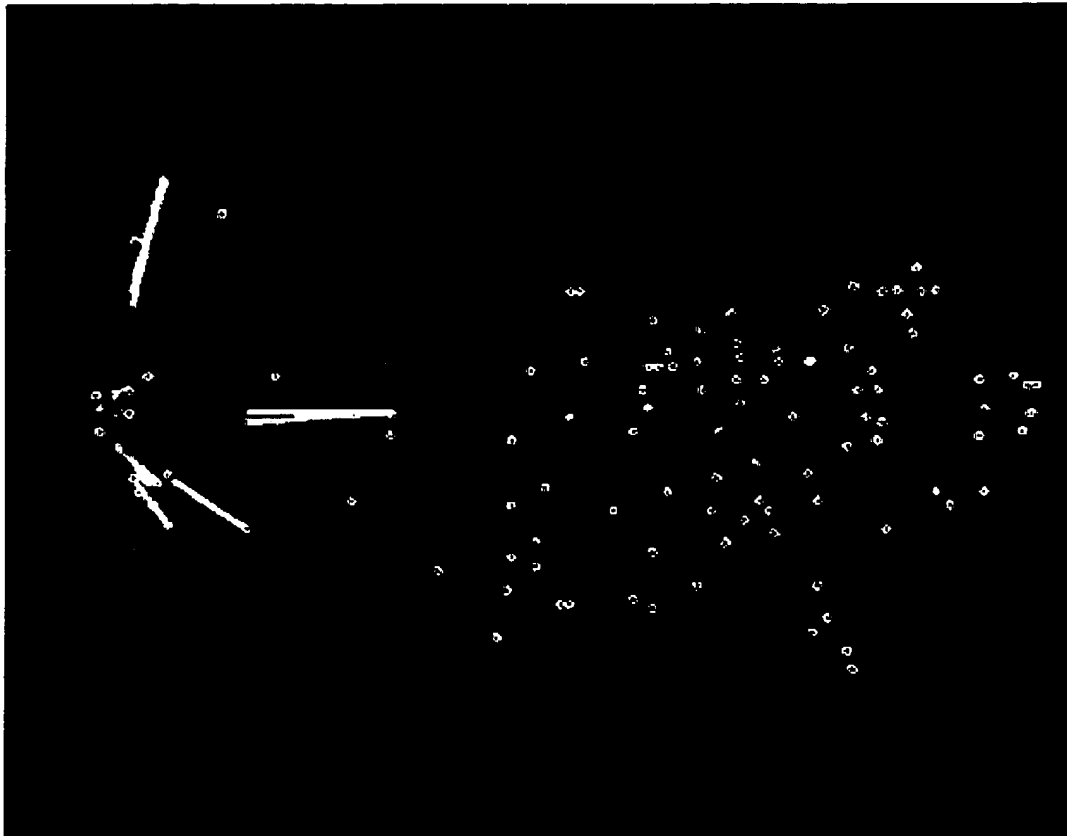


FIGURE 2

Overload Into One Node. The overload into and out of the Oakland node. The half-lines between the nodes code the overload by direction.

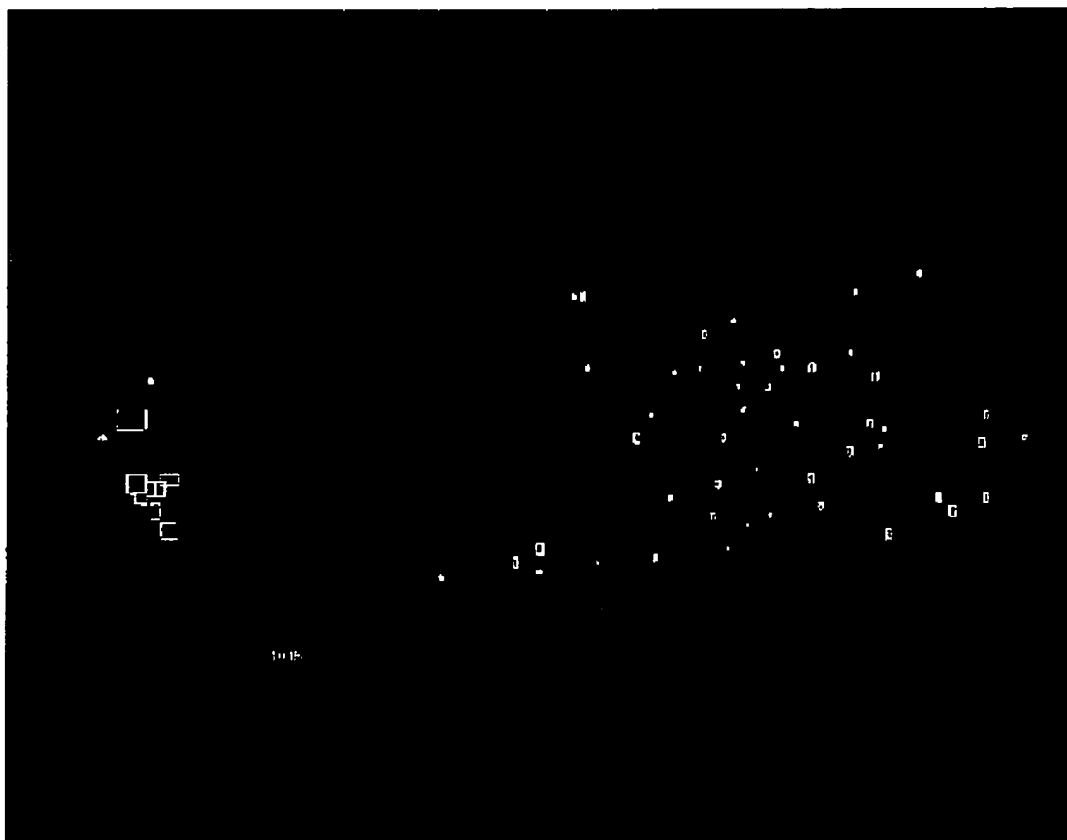
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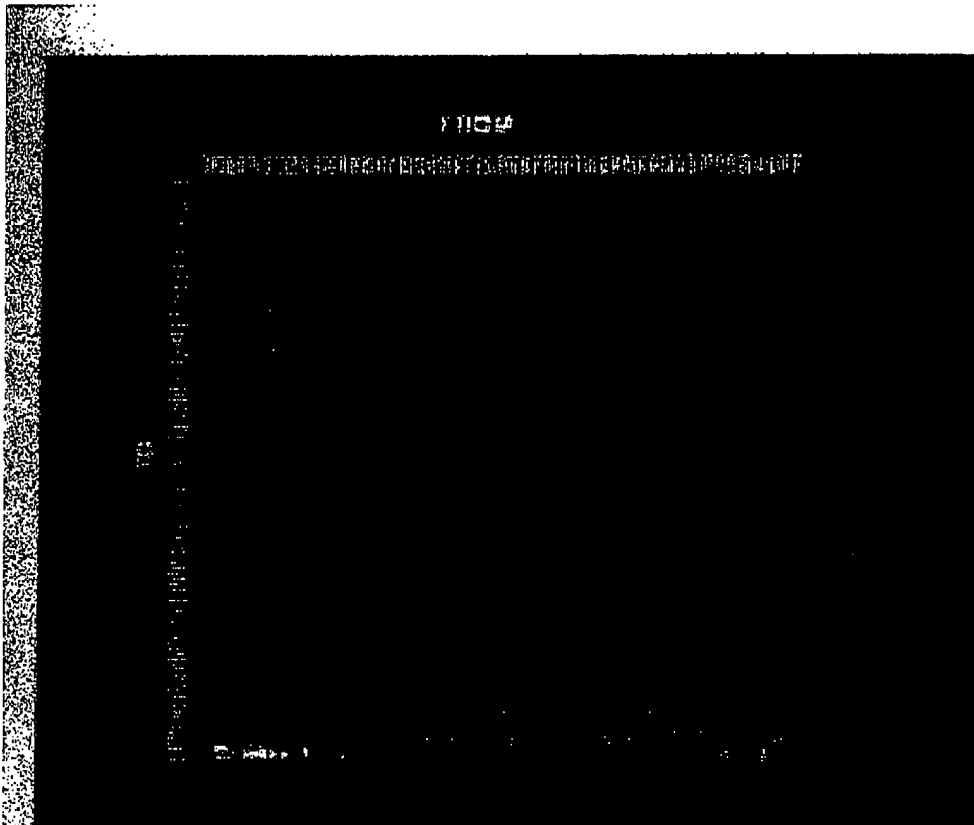
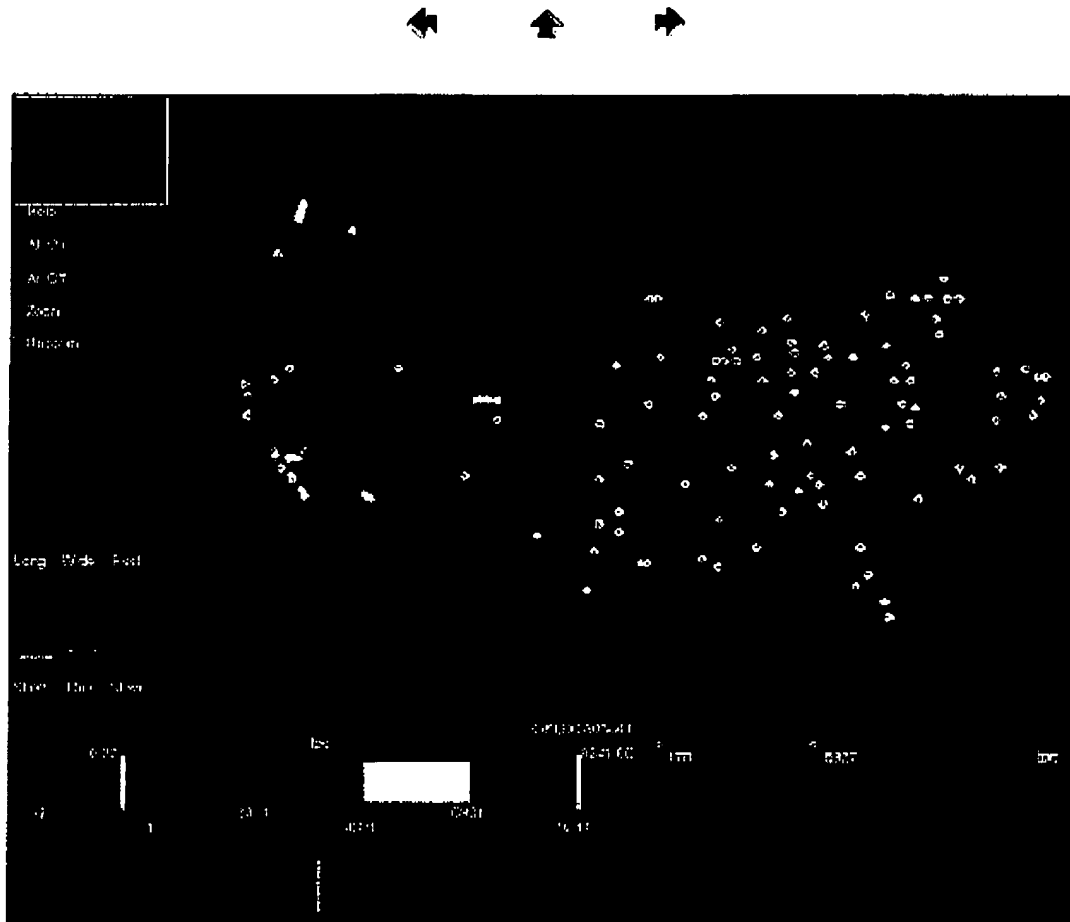


FIGURE 5

Network Overload As Matrix. The same overload as in Fig. 3 shown using a matrix representation instead of a network map. The nodes are shown along the rows and columns in approximate west-to-east order in matrix form, with columns corresponding to "from" nodes and rows corresponding to "to" nodes. At the intersection of each row and column there is a square whose color codes the link statistic. The colored squares on the left and bottom correspond to the lines on Fig. 3. The nonsymmetry is due to the directed nature of the traffic.

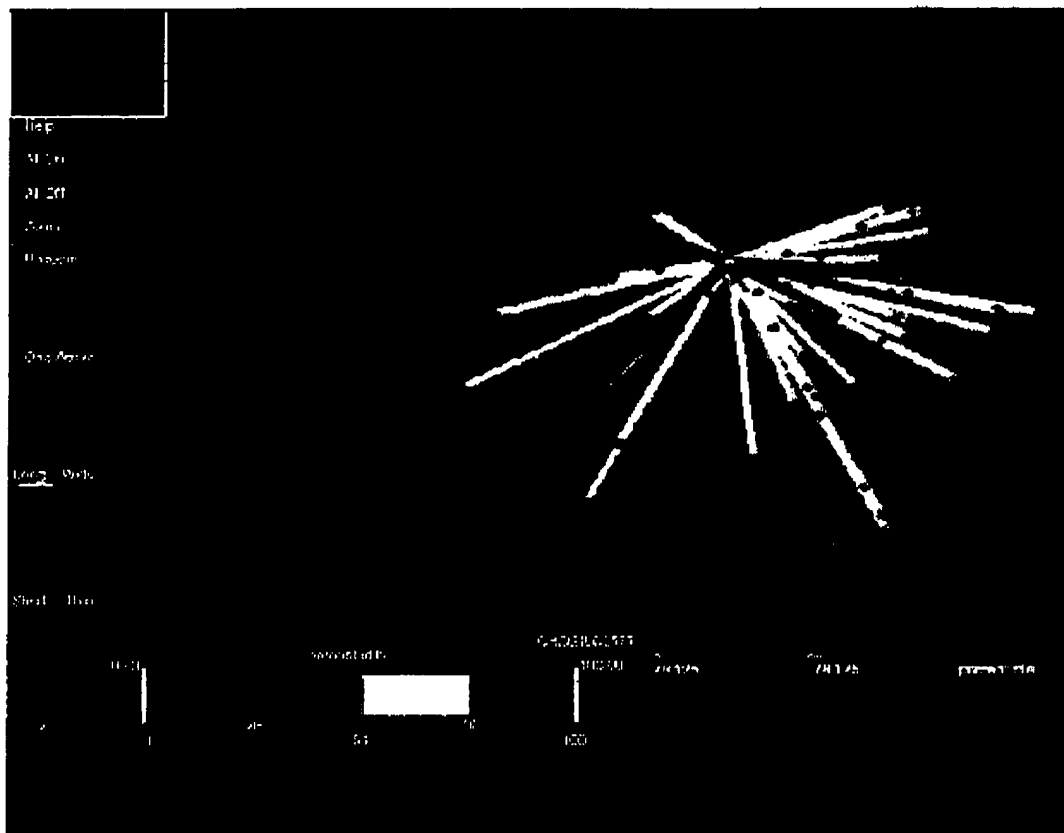
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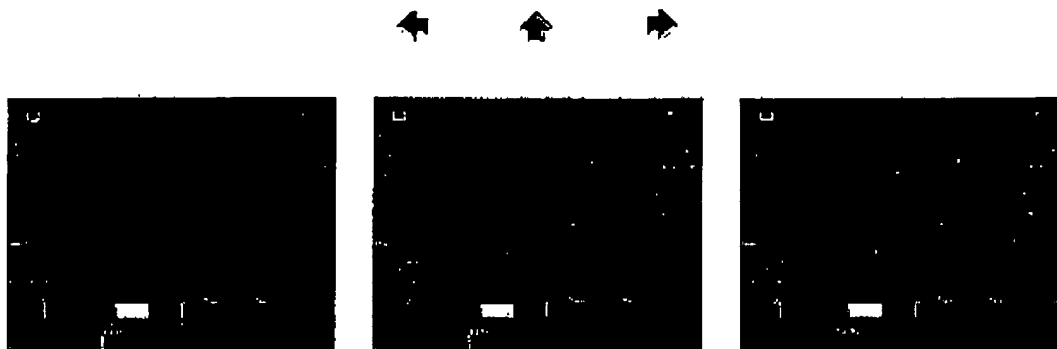
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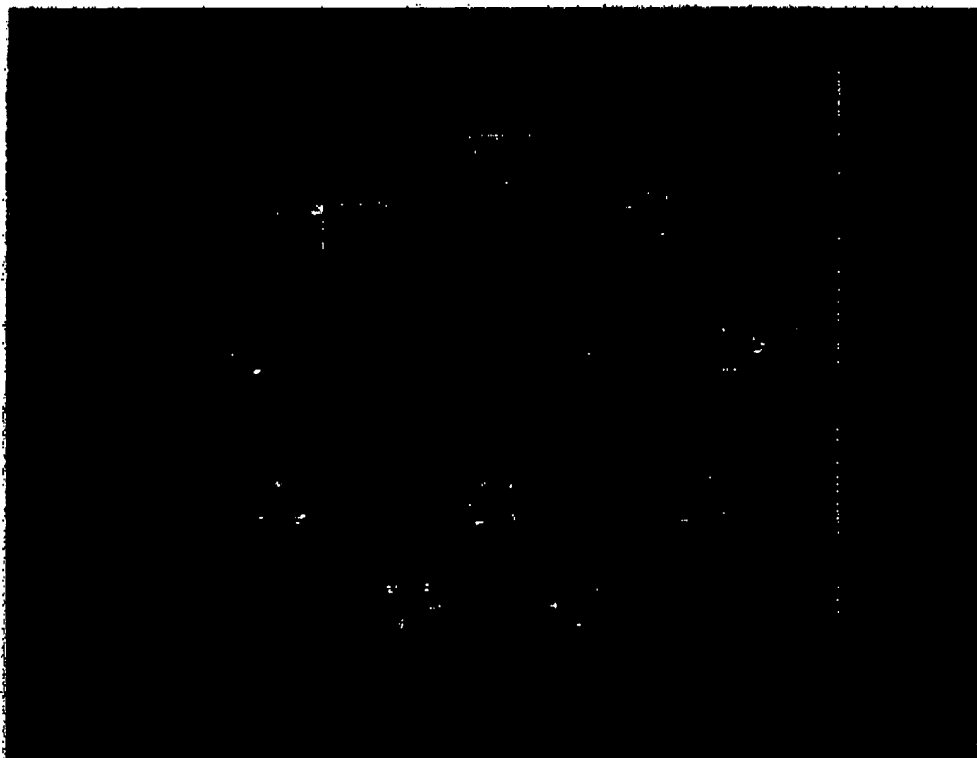


FIGURE 9

Internet Network Packet Flows. A schematic representation of the CICNet regional network, showing routers (larger circles), local area networks (smaller circles), connections between them (line segments), and byte flows along the connections (rectangles where the line segments terminate on the router circles). A flow from the ARGON (Argonne National Labs) to the MINN (University of Minnesota) local area networks can clearly be discerned, in spite of the lack of explicit information about this pair.

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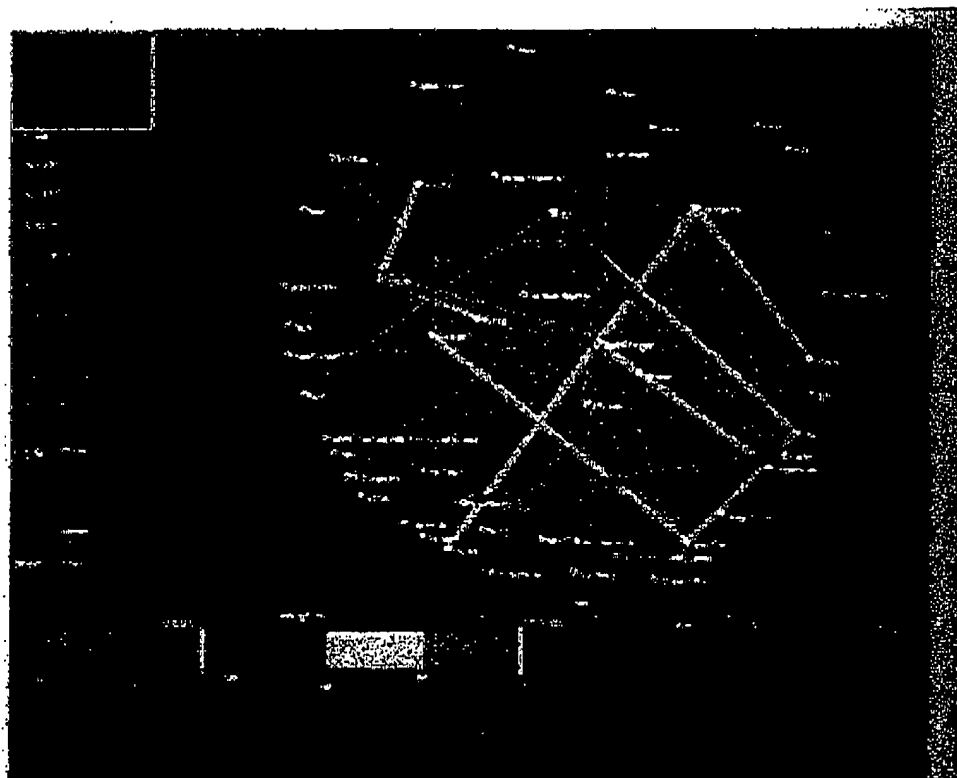


FIGURE 10

Department E-mail Communication Patterns. Each node corresponds to a user, and the links encode the number of electronic mail messages sent between the users.

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